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**METHOD OF INSULATING STRUCTURES**

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(57)

A method of insulating a structure in which two or more elongate mounting members are attached to a surface of the structure and at least one insulating panel is located between those members. The members include retaining means which engage with the insulating panel to hold it in a predetermined position relative to the opposed structure surface. An overlay sheet or panel may be secured to an outer longitudinal edge of each of the mounting members so that an air space is defined between that overlay and the insulating panel.

- 1 -

**AUSTRALIA**

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Complete Specification for the invention entitled:

**"METHOD OF INSULATING STRUCTURES"**

Our Ref: IRN 356260

The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

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### METHOD OF INSULATING STRUCTURES

This invention relates to insulation of structures against transfer of heat, or sound, or both heat and sound. It will be convenient to hereinafter describe the invention with particular reference to the insulation of walls of dwellings or houses, but it is to be understood that the invention has broader application. By way of example, the invention is also applicable to the insulation of floors and ceilings.

Insulation of buildings is a matter of general concern, and current regulations require insulation of a suitable standard in ceilings and external walls. There are many existing buildings which do not meet present day insulation requirements, and there is a strong compulsion to renovate such buildings so that present day insulation requirements are satisfied. A particular problem exists in that regard in relation to buildings having walls constructed of concrete, brick, stone, or other masonry material. With such buildings there is a difficulty in securing insulation to a surface of a wall, for example.

It is an object of the present invention to overcome the aforementioned problem. In particular, it is an object of the invention to provide a method whereby insulation can be conveniently and effectively added to a surface of a structure, such as a wall, formed of concrete, brick, stone, or other masonry material. It is a further object of the invention to provide panel mounting means for use in such a method.

According to one aspect of the invention there is provided a method which is characterised in that mounting members are secured to a surface of a structure, such as a wall, so as to be laterally spaced apart. If the structure is a wall, the members may be spaced apart across the lateral extent of that structure. The members are constructed so as to provide means for retaining an insulating panel against the structure, or in overlying spaced relationship to that structure, according to preference. The mounting members may also function as a means for securing an overlay sheet or panel which may be painted or otherwise treated to provide an attractive surface finish. That overlay is preferably secured so that an air space exists between it and the existing structure.

If desired, separate means may be used to mount the insulation and the overlay respectively.

According to another aspect of the invention there is provided a member for attaching an insulating panel to a structure including, an elongate body, means at one longitudinal edge of the body for attaching the member to a surface of a structure, and retaining means on the body which is operative to engage an edge portion of a panel so as to hold the panel in a predetermined position relative to the structure surface. It is preferred that the member also includes means for attaching an overlay sheet or panel to the member, and that means may be provided at a longitudinal edge of the body which is opposite to the previously referred to longitudinal edge.

As previously stated, it will be convenient to describe the invention with particular reference to insulation of existing wall structures. The following passages of this specification are directed to that example application of the invention. Furthermore, although the following description makes particular reference to insulation of the internal surface of an external wall, it is to be understood that the invention is also applicable to the insulation of an external surface of an external wall.

In a preferred arrangement, each mounting member is in the form of an elongate rail which is secured to the existing wall with its longitudinal axis generally upright. Two or more such rails are secured in laterally spaced relationship across the breadth of the existing wall, and the number used will depend upon the lateral extent of the wall and the nature and dimensions of the sheets and/or panels to be mounted by the rails. It is preferred that the rails are made of metal, but other material such as timber or plastics could be used.

Embodiments of the invention are described in detail in the following passages of the specification which refer to the accompanying drawings. The drawings, however, are merely illustrative of how the invention might be put into effect, so that the specific form and arrangement of the various features as shown is not to be understood as limiting on the invention.

In the drawings:

Figure 1 is a semi-diagrammatic sectional view showing one embodiment of the invention.

Figure 2 is a perspective view of part of the mounting member shown in the embodiment of Figure 1.

5      Figure 3 is a cross-sectional view taken along line III-III of Figure 2.

Figure 4 is a cross-sectional view taken along line IV-IV of Figure 2.

Figure 5 is a perspective view of part of a mounting member different to that shown in Figures 1 to 4.

10      Figure 6 is a view similar to Figure 1 showing the mounting member of Figure 5 in use.

Figure 7 is a view similar to Figure 6 but showing a different arrangement of panels.

Figure 8 is a view similar to Figure 6 but showing yet another arrangement of panels.

15      Figure 9 is a semi-diagrammatic cross-sectional view showing one particular method for attaching a panel to a structure.

20      Figure 1 shows, in semi-diagrammatic form, an installation comprising an existing wall structure 1, a mounting rail 2, insulating panels 3, and an overlay sheet 4. The total installation will include two or more mounting rails 2 located in laterally spaced relationship. It is preferred that each rail extends substantially the full height of the wall 1, but that is not essential. Two or more rails, or rail sections, could be located in longitudinal alignment between the top and the bottom of the wall 1.

25      The rails 2 may be pressed, stamped, or otherwise formed from a suitable sheet metal, but as previously stated materials other than metal could be used.

30      In the particular example shown, each rail 2 has an inner flange 5 and an outer flange 6, which are interconnected through a web 7. The rail 2 may be of somewhat channel shape in transverse cross-section as shown by Figures 1 to 4, or it may be of roughly Z-shape as shown by Figures 5 to 7. Other cross-sectional shapes could be adopted to suit individual preferences or requirements.

Each rail 2 can be secured to the inner surface 8 of the existing wall 1 in any appropriate manner. In the particular arrangement shown, the inner flange 5 is clamped to the surface 8 by one or more masonry bolts or screws 9. Selection of an appropriate bolt or screw 9 is within the competence of people skilled in the relevant art.

In the particular arrangement shown in Figure 1, the insulating panels 3 are located against the wall surface 8. Best results are achieved if those panels 3 extend the full length and the full height of the wall 1, with little or no gap between adjacent side edges of adjacent panels 3. The panels 3 may be formed of any suitable material and in any suitable manner. It is preferred however, that they are of a form as disclosed by Australian Patent Application 35248/93.

Any suitable means may be adopted to retain the panels 3 in position. In the arrangement shown by Figures 1 to 4, the retaining means is formed by lugs 10 and 20 which are punched or pressed out of the body of the rail web 7. As shown by Figures 2 to 4, the lugs 10 and 20 can be alternately arranged along the longitudinal extent of the rail 2. In the particular arrangement shown the lugs 10 are arranged to project outwards from a side surface 12 of the web 7, and the lugs 20 are arranged to project outwardly from an opposite side surface 13 of the web 7. The lugs 10 and 20 are positioned so as to firmly hold an engaged panel 3 against the wall surface 8, but each may operate in a different manner as hereinafter described. As will be apparent from Figures 1 to 4, the lugs 10 project from the side surface 12 so as to be substantially parallel to the wall surface 8, whereas the lugs 20 project angularly from the side surface 13 so as to slope outwardly and inwardly towards the wall surface 8. The purpose of that different arrangement of the lugs 10 and 20 will be hereinafter explained. Other arrangements and other forms of retaining means could be adopted to achieve a satisfactory result.

After the insulating panels 3 have been secured in place, an overlay or dressing 4 can be secured to the rails 2. By way of example, that overlay 4 may be a sheet or sheets of plaster board. Selection of an appropriate material for the overlay 4 will be determined by prevailing circumstances, such as whether the

insulation is being applied over an internal or an external surface of a wall. Attachment of the overlay 4 to the rails 2 can be effected by any suitable means, such as screws 11. The arrangement is such that an air space 14 (Figure 1) is formed between the overlay 4 and the insulation panels 3.

5 Figure 5 shows an alternative form for the rails 2, and Figures 6 and 7 show example installations involving the use of that alternative form. The installation of Figure 6 is substantially the same as that of Figure 1, whereas. Figure 7 shows a different arrangement in which a second group of insulating panels 15 is located against the inner surface of the overlay 4.

10 Yet another possible arrangement is shown by Figure 8. In that arrangement the insulating panels 3 are held in spaced relationship outwards from the wall surface 8. For that purpose, in the particular arrangement shown, the retaining means of the rail 2 includes an inner group of lugs and an outer group of lugs. The outer group is formed by the lugs 10 and 20, and the inner  
15 group is formed by lugs 16 and 17 which are spaced inwardly from the lugs 10 and 20 and are spaced outwardly from the flange 5. The arrangement is such that a cavity or space 18 is formed between the panels 3 and the surface 8. The lugs 16 and 17 resist movement of the panels 3 towards the surface 8, and the lugs 10 and 20 resist movement of the panels 3 in a direction away from the  
20 surface 8.

The lugs 16 and 17 may be punched or pressed out of the web 7 in the same manner as the lugs 10 and 20. Also, the lugs 16 and 17 may be alternately arranged along the length of the web 7 in the same general manner as adopted for the lugs 10 and 20.

25 A cable or service hole 19 is shown formed through the web 7 in the Figure 8 arrangement. Two or more such holes could be provided on either side or both sides of the panels 3. Such a cable or service hole or holes can be provided in any of the other arrangements previously referred to.

30 Figure 9 diagrammatically illustrates a method of installing a panel 3 within the panel receiving space which is formed between two adjacent rails 2. As shown, the right-hand edge portion 21 of the panel 3 is located between the surface 8 and the lugs 16 while the left-hand edge portion 22 is held outwards

from the surface 8. The edge portion 22 can be then moved inwards in the direction of the arrow so as to bear against and progressively ride-over the sloping lugs 20. Because of the relatively soft nature of the material used in the preferred insulating panel 3, the lugs 20 embed themselves into the edge portion 22 as shown in Figure 8 for example. In that regard, the lugs 20 may be of triangular shape rather than curved as shown in Figure 2, or they may be of any other shape such as to promote their intended operation.

Other fixing techniques could be adopted. By way of example, the lugs 20 may be left substantially flush with the web 7 until the panel 3 is in place, after which those lugs can be turned outwards to overlie the panel edge portion 22.

It will be apparent from the foregoing description that the present invention provides a simple and effective way of adding insulation to existing structures. A side benefit of the system is that it provides an air cavity which not only improves the insulation effect, but also serves as a space for wiring and other services.

Various alterations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the spirit or ambit of the invention.



**THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:**

1. A method of insulating a structure including the steps of:  
securing two or more elongate mounting members in laterally spaced  
5 relationship to a surface of a structure so as to form a panel receiving space  
between adjacent said members, each said member including panel retaining  
means, and positioning a panel within said space so as to overlie said surface  
and engage the panel retaining means of the two said members between which  
said space is formed, said panel retaining means being operative to establish a  
10 predetermined relationship between said panel and said surface.
2. A method according to claim 1, wherein said retaining means engages an  
edge portion of said panel so as to thereby resist movement of that edge portion  
in a direction away from said surface.
3. A method according to claim 1 or 2, wherein said predetermined  
15 relationship is such that said panel engages against said structure surface.
4. A method according to claim 1 or 2, wherein said predetermined  
relationship is such that an inner surface of said panel which is in opposed  
relationship to said structure surface is spaced outwardly from said structure  
surface, and said retaining means engages an edge portion of said panel so as to  
20 hold that edge portion against movement towards said structure surface.
5. A method according to any preceding claim, wherein said retaining means  
includes a plurality of lugs projecting outwardly from a side surface of said  
member.
6. A method according to claim 5, wherein at least one said lug projects  
25 outwardly from each of two opposite side surfaces of said member.
7. A method according to claim 6, wherein at least one said lug at one said  
side surface of the member is angled so as to slope outwardly and towards said  
structure surface.
8. A method according to claim 7, wherein the said lugs at the member side  
30 surface opposite to said one side surface project from that opposite side surface  
so as to be substantially parallel to said structure surface.

9. A method according to claim 8, wherein the said one side surface of a said member is in opposed relationship to the said opposite side surface of an adjacent said member.

10. A method according to claim 9, wherein a said panel is positioned within a said panel space by engaging one edge portion of the panel with the said lugs at said opposite side surface of one said member and subsequently moving another side edge portion of the panel inwardly towards said structure surface so as to engage the said lugs at said one side surface of another said member.

11. A method according to any one of claims 5 to 10, wherein said lugs include at least one inner lug and at least one outer lug at each of two said side surfaces of said member, each said inner lug engaging an edge portion of a said panel so as to resist movement of that edge portion towards said structure surface, and each said outer lug engaging an edge portion of said panel so as to resist movement of that edge portion away from said structure surface.

12. A method according to any preceding claim wherein an overlay sheet or panel is secured to said members so as to overlie said insulating panel in spaced relationship thereto.

13. A method according to any preceding claim wherein said member includes two substantially parallel flanges interconnected by a web portion, an inner one of said flanges is secured to said structure surface, and an outer one of said flanges provides a bearing surface for a said overlay sheet or panel.

14. A method according to claim 13, wherein each said flange projects in an opposite direction relative to said web.

15. A member for attaching an insulating panel to a structure including, an elongate body, means at one longitudinal edge of said body for attaching said member to a surface of a structure, and retaining means on said body which is operative to engage an edge portion of a said panel so as to hold the panel in a predetermined position relative to said structure surface.

16. A member according to claim 15, wherein means for attaching an overlay sheet or panel to said member is provided at a longitudinal edge of said body opposite to said one longitudinal edge.

17. A member for attaching an insulating panel to a structure substantially as herein particularly described with reference to any one of the embodiments shown in the accompanying drawings.

18. A method of insulating a structure substantially as herein particularly described with reference to any one of the embodiments shown in the accompanying drawings.

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**ABSTRACT**

A method of insulating a structure in which two or more elongate mounting members are attached to a surface of the structure and at least one insulating panel is located between those members. The members include retaining means which engage with the insulating panel to hold it in a predetermined position relative to the opposed structure surface. An overlay sheet or panel may be secured to an outer longitudinal edge of each of the mounting members so that an air space is defined between that overlay and the insulating panel.

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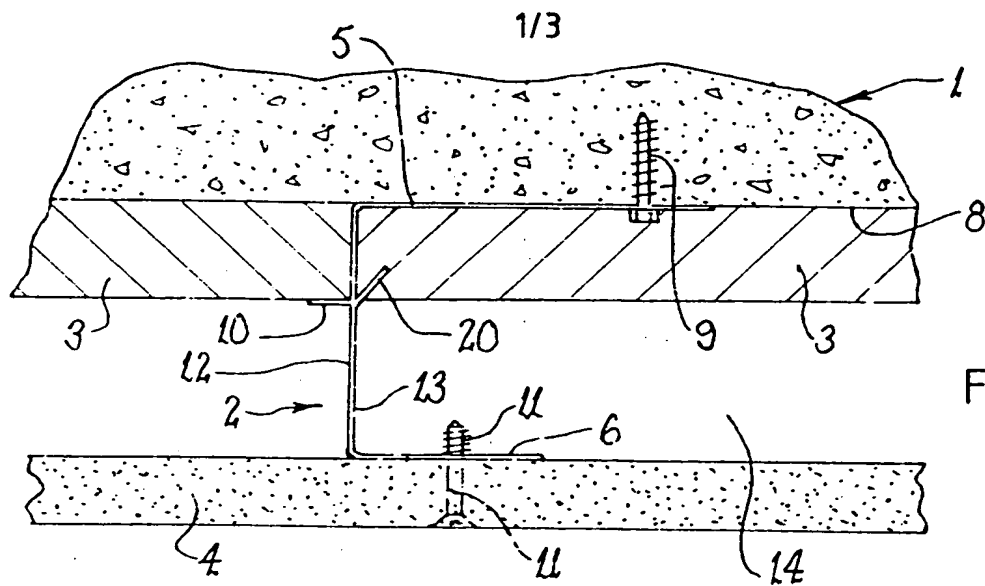


FIG 1

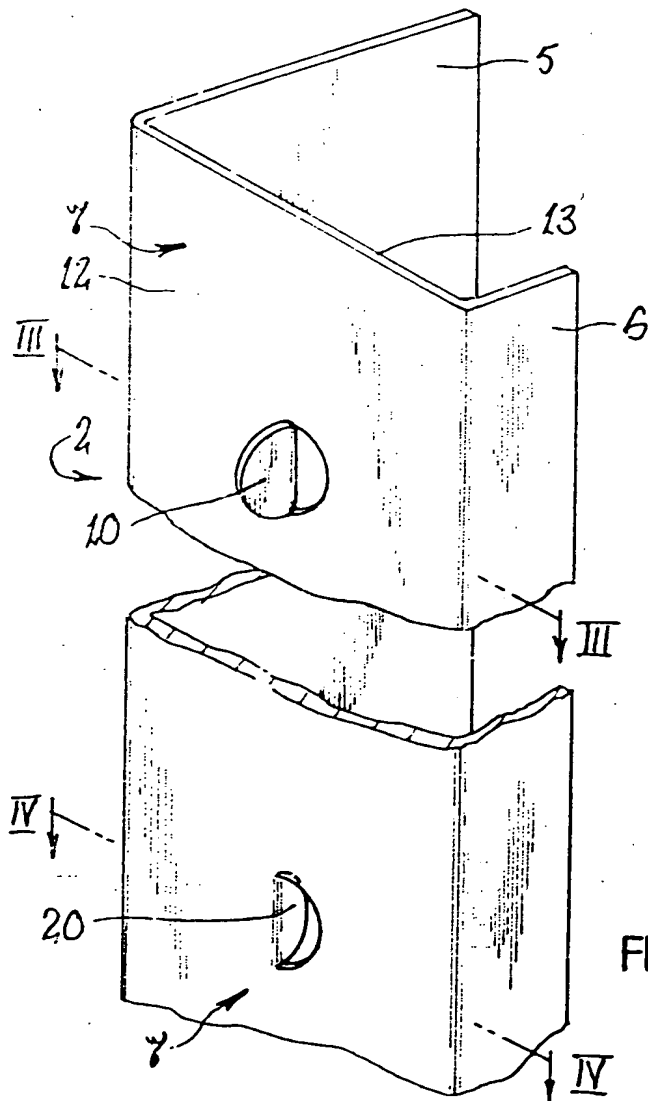


FIG 2

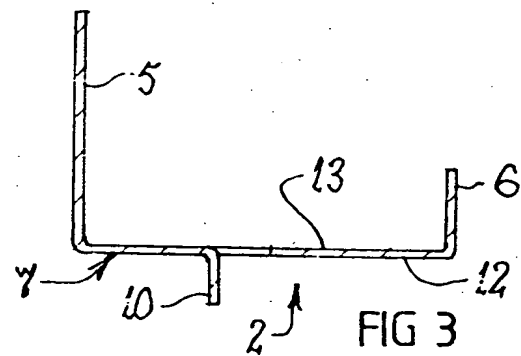


FIG 3

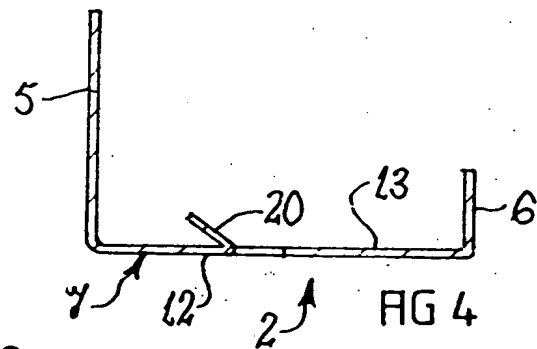


FIG 4

